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ABSTRACT

This longitudinal research study summarizes how inner-city children's development and achievement are affected by preschool attendance, varying educational models, parent involvement, and identified risk-factors. The study of Washington, DC schools began with 3 cohorts of 4-year-olds enrolled in 3 different preschool models: child initiated, academically directed, or "middle-of-the-road." Upon entering kindergarten, subjects were matched with kindergarten-only peers for follow-up evaluation. Results indicated that attending either Head Start or prekindergarten prior to entering kindergarten had a positive impact on inner-city children's development and achievement in both the short- and longer term. The type of preschool intervention was especially important, with the negative impact of didactic, academically-directed preschool becoming most evident in the transition from third to fourth grade. Failure to fulfill even the most minimal expression of parent involvement represented a clear danger to children's future school success. The need to concentrate spending on intense early intervention was identified. Results suggest that immediate attention must be focused on children with increased risk of developing academic, developmental, and/or behavioral deficits. This study's findings provide the basis for on-going systemic change in the public schools of Washington, D.C. Contains four tables. (Author/AA)

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The "D.C. Study": A Longitudinal Look at Children's Development and Achievement Under Varying Educational and Familial Conditions

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Abstract

This longitudinal research summarizes how inner-city children's development and achievement are affected by preschool attendance, varying educational models (child-initiated, academically-directed, middle-of-the-road), parent involvement, and identified risk-factors. Attending either Head Start or pre-kindergarten prior to entering kindergarten had a positive impact on inner-city children's development and achievement in both the short- and longer-term. The type of preschool intervention was especially important, with the negative impact of didactic, academically-directed preschool becoming most evident in the transition from third to fourth grade. Failure to fulfill even the most minimal expression of parent involvement represented a clear danger to children's future school success. The need to concentrate spending on intense early intervention was identified. Immediate attention must be focused on children who are at-increased-risk of developing academic, development, and/or behavioral deficits. This study's findings provide the basis for on-going systemic change in the public schools of Washington, D.C.

The "D.C. Study": A Longitudinal Look at Children's Development and Achievement Under Varying Educational and Familial Conditions

This cross-sequential study began in the 1986-87 SY (with 4-year-olds enrolled in Head Start or public pre-kindergarten) in response to an unacceptably high first grade retention rate despite heavy investment in early childhood programs by the District of Columbia Public Schools. The benefits of early education programs for children from low-income families (e.g., Lazar, Darlington, Murray, Royce, & Snipper, 1982) had not materialized in this school system, and we had to examine the possibility that experts (e.g., Elkind, 1986; Zigler, 1987) were correct in warning that inappropriate methods were detrimental to future learning motivation, resulting in long-term negative effects on adolescent social behavior and school achievement (Miller & Bizzell, 1984; Schweinhart, Barnes, & Weikart, 1993; Schweinhart, Weikart, & Larner, 1986). Because it could no longer be assumed that just any preschool curriculum would achieve positive results (Powell, 1987), the "D.C. Study" sought to find a more effective match between curriculum and child characteristics by clarifying the differential impact of preschool models on long-term school success and development of inner-city public school children. The impact of parent involvement and early-risk factors were also examined.

Sample and Design

The "D.C. Study" initially included three cohorts of 4-year-olds ('Classes of 2000, 2001, 2002') enrolled in one of three different preschool models (PK) identified for this study (child-initiated, academically-directed, middle-of-the-road) prior to entering kindergarten. Upon entering kindergarten, PK children were matched with same-sex classmates who had not attended Head Start/Pre-K (K-only). Replication of initial findings in all three cohorts led to the practical decision to continue follow-up studies with

just the 'Classes of 2000 and 2001' during at least four major transition points (i.e., entering and leaving the primary grades, entering and leaving junior high school).

The most recently reported follow-up data (Marcon, 1994a,b) included 461 children (70% recovery rate) enrolled in 95 different public schools in Washington, D.C. This sample was 97% African American and 54% female, with most children (76%) qualifying for subsidized lunch based upon low family income, and 72% living in single parent homes. The recovered PK sample had more African American children ($p < .01$) who were poorer ($p < .001$) and more likely to live in single parent families ($p < .01$). These differences were consistent with district-wide changes in enrollment patterns following kindergarten when many middle-class children leave the public schools. The recovered K-only control sample was more likely to live in two parent families ($p < .05$). Neither sample differed significantly from the original in terms of sex, age, parent involvement, or grades earned in Head Start/Pre-K or kindergarten. Wherever possible, all study data were analyzed using a covariate (eligibility for subsidized school lunch) to control for possible economic differences between children.

Summary of Results

This paper presents data and summarizes findings on four major aspects of the study. Study highlights are provided along with several key data tables. Supporting analyses and tables for this longitudinal study are provided in technical reports available from the District of Columbia Public Schools or ERIC Document Reproduction Service Nos. ED 331 934 and ED 370 699.

Head Start/Pre-K Attendance

End-of-year comparisons between matched pairs of kindergartners (PK vs. K-only) indicated significantly greater development and skills mastery among

PK children. As measured by the Vineland Scales, overall adaptive behavior ($p < .01$) and language development ($p < .01$) were higher. All K basic skill grades were significantly higher for PK children [overall grade point average (GPA): $p < .001$]. PK children also scored significantly higher on all Metropolitan Readiness Test skills (composite score: $p < .01$). Effect sizes for these differences were in the moderate range (.22 to .39).

In first grade, PK children maintained their advantage over K-only classmates. While differences were not statistically significant in first grade, there was a moderate effect size (.31) for overall GPA. The same was true in third grade, with PK attendance showing a moderate effect (.22 to .43) on overall GPA, math, spelling, handwriting, art, health/PE, and citizenship grades. A moderate size effect (.21 to .30) for PK attendance was also noted on all third grade standardized achievement test reading and language mechanics subscales. PK children maintained their advantage over K-only children in fourth grade (effect sizes: .18 to .44) with statistical differences or trends noted for spelling ($p < .05$), handwriting ($p = .10$), social studies ($p = .12$), science ($p = .09$), and citizenship ($p = .13$). Fifth grade Vineland scores showed a moderate size effect (.24 to .34) for PK attendance on overall adaptive behavior, language and social development, with a small effect (.20) on daily living skills.

Impact of Preschool Model

A three cohort analysis of development (Vineland) and basic skills (report card) at the end of PK showed significant effects for preschool model (MANCOVA: $p < .001$; see Tables 1 and 2). Children from the combination approach 'middle-of-the-road' preschools (Model M) showed significantly lower language, motor, and adaptive development than peers, and scored significantly lower in all basic skill areas. Children from 'child-initiated' programs

(Model CI) showed significantly greater mastery of all basic skills compared to peers from academically-directed' preschools (Model AD).

Insert Tables 1 and 2 about here

Although no statistically significant differences attributable to PK model were apparent in kindergarten, preschool model did have a significant impact on first grade development (MANCOVA: $p < .05$) and acquisition of basic skills (MANCOVA: $p < .01$). Model CI surpassed peers in language ($p = .08$), daily living skills ($p = .08$), social ($p < .01$), and overall adaptive development ($p < .05$, effect sizes: .49 to 1.71). They also received higher grades in all first grade subject areas (effect sizes: .13 to 1.59). In third grade, no statistically significant differences attributable to preschool model were found except for lower music grades of Model CI children ($p = .06$) and lower math grades of Model AD children ($p = .08$). A third grade standardized achievement test (Comprehensive Test of Basic Skills - CTBS) showed no affect of preschool model on total battery score.

Transition from third to fourth grade. The transition from third to fourth grade was especially difficult for Model AD children. By fourth grade Model AD children had fallen behind their peers in all subject areas except handwriting, earning a notably lower overall GPA ($p < .05$). As shown in Tables 3 and 4, performance of Model CI children generally increased from third to fourth grade, while Model M and AD performance decreased. The drop in performance since first grade was especially disconcerting for Model AD children whose overall GPA dropped 22%, with grades decreasing 36% in math, 32% in reading and language, 30% in spelling and social studies, 23% in science, and 16% in health/PE.

Insert Tables 3 and 4 about here

Developmentally, Model AD children also fell behind their peers in all Vineland domains measured in third and fourth grade. They were significantly lower in social ($p < .001$) and adaptive development ($p < .01$), and exhibited a 37% higher incidence of maladaptive behavior ($p = .12$).

Parent Involvement

Children's Pre-K/Head Start, kindergarten, first grade, and third or fourth grade teachers were interviewed to determine extent of contact they had with each child's parent(s) during the school year. Categories of contact included: parent-teacher conference, home visit by teacher, extended class visit by parent, and parental help with class activity. At each grade level, two groups of children were identified based upon low (0 or 1 category fulfilled) or high (3 or 4 categories fulfilled) parent-school contact. Head Start parents and teachers were significantly more likely to have contact with each other than were teachers and parents of children who attended public Pre-K ($p < .001$). The same was true in kindergarten ($p = .07$). However, in first, third, and fourth grades, no significant differences in involvement were found between Head Start and Pre-K parents.

Grades and development were significantly higher at the end of preschool for children with high parent involvement. In kindergarten, adaptive development and reading skills were higher among children whose parents were more involved. Significant study findings on the long-term impact of early parent involvement are presented in the technical report.

Identifying Risk Factors

Various risk factors related to children's sex, poor attendance, moving, low parent involvement, language deficits, and early learning model were identified. An increased likelihood of special education placement was associated with low parent involvement ($p < .05$), moving prior to third grade ($p = .15$), and attending an academically-focused kindergarten ($p = .06$). More PK boys ($p < .001$) and K-only girls ($p = .12$) were retained prior to third grade. For PK children, frequent moves were also associated with a higher retention rate throughout their school careers ($p < .05$). Difficulty in making the transition from the primary grades to upper elementary was associated with overly academic early learning experiences (PK: $p < .01$; K-only: $p = .14$), moving after first grade ($p < .01$), and attendance problems during children's first year in school (PK: $p < .001$; K-only: $p = .07$). Receptive language deficits contributed to later maladaptive behavior (cumulative $R^2 = .197$). Discriminate analysis found kindergarten receptive skills to be the best measure for successfully categorizing 78% of the children who would eventually be classified as significantly maladapted in fourth and fifth grades.

Discussion

Although size effects were moderate, Head Start/Pre-K attendance prior to entering kindergarten had a positive impact on inner-city children's development and achievement in both the short- and longer-term. However, the type of preschool intervention was especially important.

Negative affects of didactic, academically-directed preschool were most evident in the transition from third to fourth grade. Pushing children too soon into "formalized academics" can backfire when children move into the later childhood grades where they are expected to think more independently. A

highly teacher-directed approach may curtail development of autonomy and create passive students who wait to be told what to think and do next. Therefore, it is not surprising that children who lacked the early foundations of autonomy--the root of critical thinking and effective choice making--found the transition to fourth grade difficult. In contrast, long-term positive affects of active, child-initiated early learning experiences were clearly evident in the transition to the later childhood grades.

The impact of parent involvement on school competence, academic achievement, and inner-city children's development was especially noteworthy because none of the types of parent involvement examined in this study required large amounts of time, yet the results were remarkable and enduring. Failure to fulfill even the most minimal expression of parent involvement represented a clear danger to children's future school success. Strategies used by D.C.'s Consolidated Head Start program appeared to have been especially effective in stimulating meaningful parent involvement.

Schools could readily address a number of the risk factors identified in this study. These findings suggest a need to concentrate spending on intense early intervention, providing immediate attention to children who are at-increased-risk for developing academic, developmental, and/or behavioral deficits.

The "D.C. Study" has already provided a wealth of information useful not only to policymakers and practitioners in this public school system, but to any who are trying to better serve the needs of poor children and families. As an on-going formative study, it has been especially critical to work closely with policymakers and practitioners. In this regard the public schools of Washington, D.C. have clearly succeeded.

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Table 1

Vineland Scores by Preschool Model

		Model CI	Model M	Model AD	
Composite Score					
Adaptive Behavior	M	102.97[a]	95.93[a,b]	100.65[b]	F(2,691)=13.53*
	SD	(13.16)	(14.39)	(16.61)	
Domain Scores					
Communication	M	106.51[a]	93.48[a,b]	103.59[b]	F(2,622)=23.50*
	SD	(17.98)	(15.80)	(18.91)	
Daily Living	M	102.09	99.88	99.08	ns
	SD	(12.79)	(15.55)	(15.61)	
Social	M	95.46	93.15	96.33	ns
	SD	(11.12)	(14.07)	(16.15)	
Motor	M	107.58[a]	99.99[a]	103.74	F(2,622)=8.59*
	SD	(15.64)	(16.59)	(17.16)	

Note. Within a row, means sharing a superscript are significantly different.

* p < .001

Table 2

Progress Report Scores by Preschool Model

		Model CI	Model M	Model AD	
Overall G.P.A.	M	2.73[a,c]	2.49[a,b]	2.60[b,c]	F(2,605)=17.26*
	SD	(.30)	(.37)	(.30)	
Subareas					
Math/Science	M	2.64[a,c]	2.37[a]	2.42[c]	F(2,568)=25.46*
	SD	(.38)	(.43)	(.41)	
Verbal	M	2.78[a,c]	2.52[a,b]	2.66[b,c]	F(2,568)=13.68*
	SD	(.31)	(.40)	(.31)	
Social	M	2.80[a,c]	2.58[a,b]	2.70[b,c]	F(2,568)=13.79*
	SD	(.29)	(.42)	(.29)	
Physical	M	2.76[a,c]	2.55[a,b]	2.63[b,c]	F(2,568)=7.46*
	SD	(.32)	(.45)	(.39)	

Note. Overall Grade Point Average (G.P.A.) and subarea scores could range from 1.00 to 3.00, with higher scores indicative of greater skill mastery. Within a row, means sharing a superscript are significantly different.

* p < .001

Table 3

Impact of Pre-K/Head Start Model on Transition from 3rd Grade to 4th Grade

	"On Schedule" Children				All Children ("Year 5" to "Year 6")			
	CI	M	AD	ANCOVA (Model x Year)	CI	M	AD	ANCOVA (Model x Year)
Overall G.P.A.								
3rd grade	2.74	2.90	2.60	$F(2,102) = 5.09, p < .01$	2.90	2.83	2.42	$F(2,135) = 4.97, p < .01$
4th grade	2.95	2.78	2.35		2.69	2.49	2.26	
Subjects								
Math								
3rd grade	2.42	2.60	2.22	$F(2,101) = 2.11, p = .12$	2.07	2.28	2.02	$F(2,133) = 3.45, p < .05$
4th grade	2.71	2.60	2.00		2.50	2.36	1.91	
Reading								
3rd grade	2.52	2.73	2.40	$F(2,101) = 2.35, p = .10$	2.16	2.36	2.19	$F(2,133) = 3.08, p < .05$
4th grade	2.77	2.57	2.16		2.50	2.24	2.00	
Language								
3rd grade	2.62	2.92	2.53	ns	2.29	2.61	2.36	$F(2,134) = 2.80, p = .06$
4th grade	2.56	2.62	2.11		2.38	2.31	2.05	
Spelling								
3rd grade	2.75	2.89	2.69	$F(2,101) = 3.19, p < .05$	2.38	2.59	2.45	$F(2,134) = 2.25, p = .10$
4th grade	3.06	2.84	2.36		2.67	2.49	2.29	
Handwriting								
3rd grade	2.75	2.84	2.56	ns	2.62	2.55	2.36	ns
4th grade	2.91	2.62	2.53		2.73	2.39	2.40	
Social Studies								
3rd grade	2.64	3.00	2.50	ns	2.49	2.67	2.31	ns
4th grade	2.64	2.81	2.17		2.46	2.51	2.12	
Science								
3rd grade	2.68	3.03	2.56	$F(2,99) = 2.78, p = .06$	2.54	2.76	2.36	ns
4th grade	2.94	2.81	2.36		2.67	2.59	2.26	
Art								
3rd grade	3.12	2.93	2.81	ns	3.03	2.74	2.75	ns
4th grade	3.23	2.90	2.71		3.05	2.67	2.58	
Music								
3rd grade	3.00	2.93	2.93	ns	2.82	2.76	2.77	ns
4th grade	3.14	3.03	2.82		2.88	2.76	2.71	
Health/P.E.								
3rd grade	3.23	3.22	2.88	$F(2,86) = 3.44, p < .05$	2.97	3.02	2.74	$F(2,115) = 3.86, p < .05$
4th grade	3.50	3.03	2.53		3.25	2.84	2.47	
Citizenship								
3rd grade	2.83	3.06	2.50	ns	2.50	2.72	2.26	$F(2,114) = 2.28, p = .10$
4th grade	3.13	3.06	2.42		2.75	2.53	2.29	

Table 4

Impact of Pre-K/Head Start Model on Progress from 1st Grade to 4th Grade

	"On Schedule" Children				All Children (1st Grade to "Year 6")			
	CI	M	AD	ANCOVA (Model x Year)	CI	M	AD	ANCOVA (Model x Year)
Overall G.P.A.								
1st grade	2.97	3.00	3.01	$F(2,90) = 7.42, p < .001$	2.68	2.63	2.36	$F(2,123) = 5.32, p < .01$
4th grade	2.83	2.82	2.34		2.65	2.49	2.25	
Subjects								
Math								
1st grade	2.87	3.18	3.03	$F(2,86) = 5.19, p < .01$	2.35	2.62	2.60	$F(2,118) = 3.73, p < .05$
4th grade	2.55	2.68	1.94		2.33	2.28	1.85	
Reading								
1st grade	2.83	3.00	3.16	$F(2,85) = 6.17, p < .01$	2.21	2.41	2.34	$F(2,116) = 6.04, p < .01$
4th grade	2.60	2.61	2.13		2.40	2.18	2.00	
Language								
1st grade	2.85	3.00	3.03	$F(2,88) = 4.06, p < .05$	2.49	2.56	2.68	$F(2,120) = 2.84, p = .06$
4th grade	2.52	2.59	2.07		2.33	2.22	2.00	
Spelling								
1st grade	3.09	3.00	3.23	$F(2,86) = 5.30, p < .01$	2.60	2.40	2.81	$F(2,116) = 3.33, p < .05$
4th grade	3.00	2.89	2.27		2.69	2.32	2.19	
Handwriting								
1st grade	2.94	2.90	2.74	ns	2.62	2.58	2.42	ns
4th grade	2.85	2.66	2.55		2.60	2.39	2.38	
Social Studies								
1st grade	3.06	3.00	3.00	$F(2,88) = 4.15, p < .01$	2.81	2.68	2.80	$F(2,119) = 3.35, p < .05$
4th grade	2.59	2.90	2.10		2.47	2.56	2.05	
Science								
1st grade	3.12	3.00	3.06	$F(2,87) = 3.43, p < .05$	2.84	2.70	2.82	$F(2,118) = 2.95, p < .05$
4th grade	2.88	2.89	2.36		2.65	2.68	2.26	
Art								
1st grade	2.97	2.79	3.12	ns	2.97	2.65	2.97	ns
4th grade	3.03	2.83	2.83		3.00	2.71	2.78	
Music								
1st grade	2.96	3.04	3.00	ns	2.86	2.91	2.97	ns
4th grade	2.85	3.04	2.74		2.77	2.71	2.74	
Health/P.E.								
1st grade	3.19	3.00	3.10	$F(2,76) = 6.56, p < .01$	3.17	2.84	2.97	$F(2,109) = 4.13, p < .01$
4th grade	3.38	3.04	2.59		3.17	2.89	2.50	
Citizenship								
1st grade	3.03	2.88	2.54	ns	2.82	2.51	2.29	ns
4th grade	2.87	3.32	2.50		2.74	2.65	2.26	